ACCESSION #: 9701080074

LICENSEE EVENT REPORT (LER)

FACILITY NAME: Sequoyah Nuclear Plant (SQN) Unit 2 PAGE: 1 OF 6

DOCKET NUMBER: 05000328

TITLE: Automatic Reactor Trip Because of the Loss of Power to

Start Bus 2A, the Start of Four Emergency Diesel

Generators, and Loading of Emergency Diesel Generator 2B-

B.

EVENT DATE: 12/6/96 LER #: 96-006-00 REPORT DATE: 1/2/97

OTHER FACILITIES INVOLVED: N/A DOCKET NO: 05000

OPERATING MODE: 1 POWER LEVEL: 100

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR SECTION:

50.73(a)(2)(iv)

LICENSEE CONTACT FOR THIS LER:

NAME: J. Bajraszewski, Compliance Licensing TELEPHONE: (423) 843-7749

Engineer

COMPONENT FAILURE DESCRIPTION:

CAUSE: SYSTEM: COMPONENT: MANUFACTURER:

REPORTABLE NPRDS:

SUPPLEMENTAL REPORT EXPECTED: NO

ABSTRACT:

On December 6, 1996, at 0033 Eastern standard time, with Unit 2 in power operation at approximately 100 percent, the reactor automatically tripped because of the loss of power to Start Bus 2A. When the 2A start bus lost power, a reactor trip was initiated as a result

of a bus undervoltage condition for Reactor Coolant Pumps 1 and 3. Start Bus 2A lost power because the alternate source feeder breaker opened without a legitimate trip signal. The 2A start bus was being supplied by the alternate source, common station service transformer (CSST) B. The normal feeder (CSST A and the 2A start bus normal feeder breaker) was out of service for maintenance activities. At the time of the trip, maintenance personnel had opened the normal feeder breaker compartment to continue maintenance work in the compartment when the alternate feeder breaker opened. Investigation into the event did not identify any equipment failure or inappropriate personnel action. A refurbished breaker was installed in the 2A start bus normal feeder breaker compartment, the breaker was tested, found acceptable, and the bus was returned to service.

TEXT PAGE 2 OF 6

I. PLANT CONDITIONS

Unit 2 was in power operation at approximately 100 percent.

II. DESCRIPTION OF EVENT

A. Event:

On December 6, 1996, at 0033 Eastern standard time (EST), the reactor automatically tripped because of the loss of power to Start Bus 2A [EIIS Code EA]. When Start Bus 2A lost power, a reactor trip was initiated as a result of a bus undervoltage condition for Reactor Coolant Pumps 1 and 3. Start Bus 2A lost power because the alternate source feeder breaker [EIIS Code BKR] opened without a legitimate trip signal. The 2A start bus was being supplied by the alternate source, common station service transformer (CSST) B. The normal feeder (CSST A and the 2A start bus normal feeder breaker) was out of service for maintenance activities. At the time of the trip, maintenance personnel had opened the normal feeder breaker compartment to

continue maintenance work in the compartment when the alternate feeder breaker opened.

B. Inoperable Structures, Components, or Systems that Contributed to the Event:

None.

C. Dates and Approximate Times of Major Occurrences:

November 17, 1996 Normal feeder breakers to start bus 1A and at 2310 EST 2A and CSST A are removed from service for maintenance.

December 6, 1996 Maintenance personnel opened the Start Bus at approximately 2A normal feeder breaker compartment door 0030 EST to reinstall grounds.

December 6, 1996 The Start Bus 2A alternate feeder breaker at 0033 EST tripped open deenergizing the 2A start bus, 6.9-kilovolt (kV) Unit Board 2A and 2C, and the 6.9-kV Shutdown Board 2B-B. The

four emergency diesel generators started, and the 2B-B emergency diesel started and loaded (appropriate loads were shed and required loads were automatically sequenced back).

December 6, 1996 Emergency diesels 1A-A, 1B-B, and 2A-A were

at 0155 EST shut down.

December 7, 1996 Start Bus 2A was energized from the normal
at 1122 EST source (CSST A).

December 7, 1996 Blackout relays were reset in accordance
at 1338 EST with procedure allowing the 2B-B diesel
generator to be shut down.

D. Other Systems or Secondary Functions Affected:

None.

E. Method of Discovery:

The reactor and turbine trips were annunciated in the main
control room.

F. Operator Actions:

Control room personnel responded as prescribed by emergency
procedures. They promptly diagnosed the plant condition and
took actions necessary to stabilize the unit in the hot
standby, Mode 3.

G. Safety System Responses:

The equipment required to respond to the reactor trip operated
as designed. The four emergency diesel generators started and
the 2B-B emergency diesel generator loaded upon loss of the 2A
start bus. Load shedding and sequencing occurred as designed.
Following the reactor trip, the turbine tripped, feedwater
isolation occurred, and auxiliary feedwater system started as

expected.

III. CAUSE OF THE EVENT

A. Immediate Cause:

The immediate cause of the event was a loss of power to Start Bus 2A. Loss of start bus power resulted in an undervoltage condition in reactor coolant pumps 1 and 3. The undervoltage condition initiated the reactor trip.

B. Root Cause:

The root cause of the event was not determined. At the time of the trip, two electrical maintenance craftsmen were in the vicinity of the 2A start bus normal and alternate feeder breaker compartments. After opening the normal feeder breaker compartment door, the craftsman noted that the bus shutters were not fully closed. The bus shutters are operated by a linkage contained inside the breaker compartment. In addition to the bus shutter linkage, the compartment contains a mechanical/electrical interlock between the normal and alternate feeder breakers. The interlock linkage is located approximately 18 to 24 inches inside the breaker cubicle and was not identified to indicate that its movement will trip the companion breaker. In statements taken immediately after the unit trip and during subsequent interviews, the craftsmen

stated that they took no inappropriate action(s). An equipment failure analysis was performed by ASEA-Brown Boveri (ABB) (the breaker manufacturer) on the breaker that opened. ABB did not identify any hardware deficiency that could have caused the opening of the breaker without a legitimate trip signal.

C. Contributing Factors

None.

IV. ANALYSIS OF THE EVENT

The plant responses during and after the unit trip were consistent with the responses described in the Final Safety Analysis Report. Therefore, the event did not adversely affect the health or safety of plant personnel or the general public.

V. CORRECTIVE ACTIONS

A. Immediate Corrective Actions:

Control room personnel responded as prescribed by emergency procedures. They promptly diagnosed the plant condition and took actions necessary to stabilize the unit in the hot standby, Mode 3.

An evaluation was performed to determine the potential signals that could trip the feeder breaker. Each potential trip was studied to determine if it could have caused the trip. In the cases where no conclusive evidence existed to ensure that the

potential trip signal did not cause the breaker to open, testing was performed to eliminate that potential signal as a cause. Either through evaluation or testing, no trip signals were identified that could have caused the 2A start bus alternate feeder breaker to open.

A spare (refurbished) breaker was installed into the Start Bus 2A normal feeder compartment. The breaker was tested, found to be acceptable, and placed in service supplying the 2A start bus.

B. Corrective Actions to Prevent Recurrence:

No additional actions are necessary to prevent recurrence.

VI. ADDITIONAL INFORMATION

A. Failed Components:

None.

B. Previous LERs on Similar Events:

A review of previous reportable events identified one licensee event report (LER) (50-327/96004) that was associated with an inadvertent loss of power signal and start of four emergency diesel generators. The cause of that event was the failure of the normal feeder breaker's operating mechanism. As a result of the event

contained in that LER, a spare breaker was purchased and a

breaker refurbishment/preventive maintenance program was initiated for the 6.9-kV breakers. Preventive maintenance of the 6.9-kV breakers was in progress when the unit tripped. However, no equipment failure was identified in the event described by this LER.

C. Additional Information:

The start bus feeder breakers at SQN are Gould-Brown Boveri (currently ASEA-Brown Boveri), Type 15HK-1000 breakers. SQN has eight of these breakers, which are installed in the start bus switchgear plus one spare breaker.

The normal feeder breaker was out of service before the event as part of a program to refurbish the start bus feeder breakers to ensure equipment reliability. Start bus breaker refurbishment will continue and is expected to be completed in the summer of 1997.

To increase awareness of trip risk when working in or around start bus breaker cubicles, "Trip Sensitive Device" tags are being added to the breaker enclosures as the breakers are refurbished. Tag installation and breaker refurbishment are scheduled to be complete in May 1997. Training will be provided to appropriate personnel relative to the function of the levers (bus shutter and breaker interlock) contained inside the start bus breaker enclosures before maintenance activities

are continued for refurbishment of the remaining 6.9-kV

breakers.

VII. COMMITMENTS

None.

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Tennessee Valley Authority, Post Office Box 2000, Soddy-Daisy, Tennessee

37379-2000

R.J. Adney

Site Vice President

Sequoyah Nuclear Plant

January 2, 1997

U.S. Nuclear Regulatory Commission

ATTN: Document Control Desk

Washington, D.C. 20555

Gentlemen:

TENNESSEE VALLEY AUTHORITY - SEQUOYAH NUCLEAR PLANT (SQN) UNIT 2 - DOCKET

NO. 50-328 - FACILITY OPERATING LICENSE DPR-79 LICENSEE EVENT REPORT

(LER) 50-328/96006

The enclosed report provides details concerning an automatic reactor trip

as a result of the loss of power to Start Bus 2A, the start of four

emergency diesel generators, and loading of emergency diesel generator

2B-B. This event is being reported in accordance with 10 CFR 50.73(a)(2)(iv) as a condition that resulted in automatic actuation of engineered safety features, including the reactor protection system.

Sincerely,

R. J. Adney

Enclosure

cc: See page 2

Enclosure

cc (Enclosure):

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